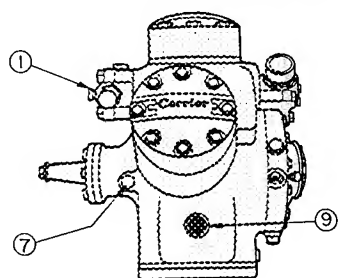


# Compressors and Condensing Units

Open, Water-Cooled

## COMPRESSOR AND CONDENSING UNIT PHYSICAL DATA



\*Also used for low pressure oil line connection.  
†This bank of cylinders on 5F30 only.

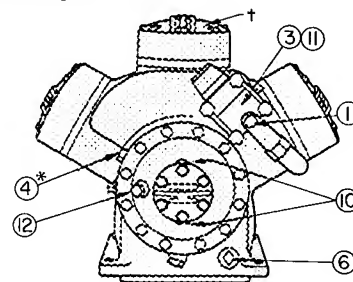
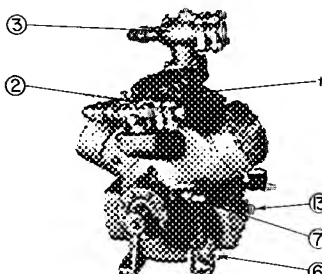


Fig. 1 - 5F20, 2-Cyl and 5F30, 3-Cyl Compressors



\*Also used for low pressure oil line connection.  
†This bank of cylinders on 5F60 only.

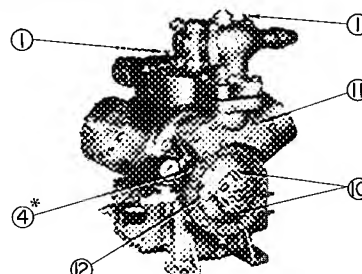
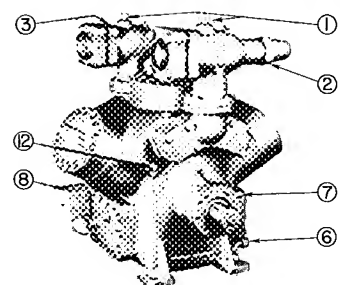


Fig. 2 - 5F40, 4-Cyl and 5F60, 6-Cyl Compressors



\*This bank of cylinders on 5H60 and 66 only.

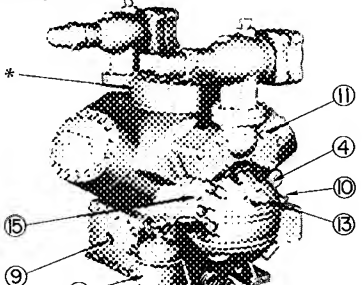
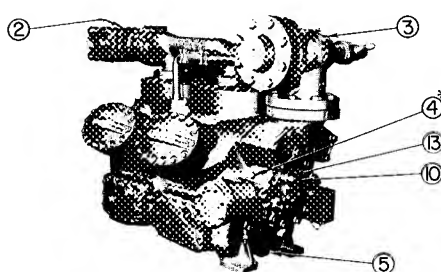


Fig. 3 - 5H40, 46, 4-Cyl and 5H60, 66, 6-Cyl Compressors



\*Also used for low pressure oil line connection on 5H120 and 126.  
†5H80 and 86 only.  
‡These banks of cylinders on 5H120 and 126 only.

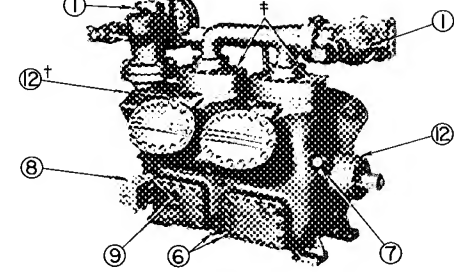


Fig. 4 - 5H80, 86, 8-Cyl and 5H120, 126, 12-Cyl Compressors

### COMPRESSOR KEY

- ① Gage connection 1/4-inch IPS.
- ② Discharge shut-off valve. (See Physical Data for size.)
- ③ Suction shut-off valve. (See Physical Data for size.)
- ④ Oil filler plug
- ⑤ Crankcase drain (5/8-inch -18 plug on all 5F compressors, shut-off valve on all 5H compressors)
- ⑥ Crankcase heater casing
- ⑦ Oil pressure regulator

- ⑧ Dual pressurestat.
- ⑨ Oil level sight glass
- ⑩ Oil pump rotation arrows
- ⑪ Suction valve, manifold or manifold cover. Remove for access to suction strainer.
- ⑫ Oil pressure connection 1/4-inch IPS (high pressure).
- ⑬ Capacity control adjustment.
- ⑭ Oil Filter
- ⑮ Oil pressure connection 1/4-inch IPS (low pressure).

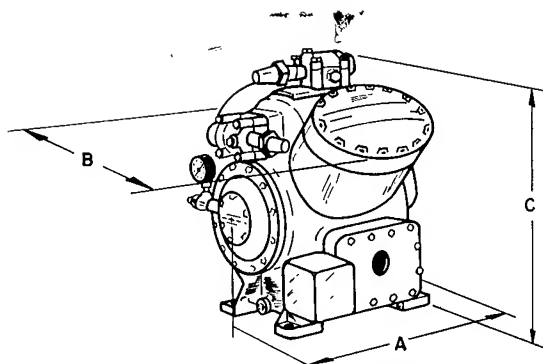


Fig. 5 - Bare Compressor

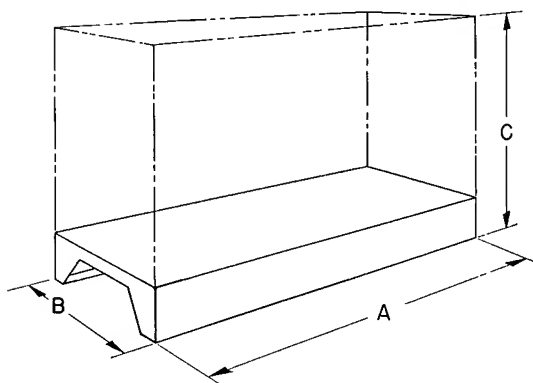


Fig. 6 - Belt Drive, Direct Drive and Duplex Compressor Unit

Table 1 - Compressor Physical Data

BARE (Fig. 5)									
COMPRESSOR	5F				5H				
	20	30	40	60	40, 46	60, 66	80, 86	120, 126	
WT (lb)	175	215	355	400	610	795	1115	1580	
DIM. (ft-in.)	A	1-3 $\frac{3}{4}$	1-6	1-9 $\frac{1}{2}$	1-11 $\frac{1}{2}$	2-6 $\frac{1}{2}$	2-7 $\frac{1}{2}$	3-7 $\frac{1}{2}$	3-11
	B	1-6 $\frac{3}{4}$	1-8 $\frac{3}{4}$	1-7	1-9	2-0 $\frac{1}{2}$	2-3 $\frac{3}{4}$	2-0 $\frac{1}{2}$	2-3 $\frac{3}{4}$
	C	1-6 $\frac{3}{4}$	1-6	1-8 $\frac{3}{4}$	2-0 $\frac{1}{2}$	2-5	2-5 $\frac{1}{2}$	2-8	2-10 $\frac{7}{8}$
BELT DRIVE* (Fig. 6)									
WT (lb)	260	300	515	600	915	1095	1650	2215	
DIM (ft-in.)	A	3-2	3-3	3-9 $\frac{3}{4}$	3-9 $\frac{3}{4}$	4-8 $\frac{3}{4}$	4-9 $\frac{3}{4}$	5-6 $\frac{1}{4}$	5-7 $\frac{3}{8}$
	B	1-9 $\frac{3}{4}$	1-9 $\frac{3}{4}$	2-2 $\frac{1}{4}$	2-2 $\frac{1}{4}$	2-8 $\frac{3}{4}$	2-10	3-9 $\frac{3}{8}$	3-11 $\frac{3}{8}$
	C	2-5	2-4 $\frac{1}{4}$	2-1 $\frac{1}{4}$	2-6 $\frac{1}{4}$	3-1 $\frac{1}{4}$	3-2 $\frac{1}{4}$	3-6 $\frac{1}{4}$	3-4 $\frac{1}{4}$
DIRECT DRIVE (Fig. 6)									
WT (lb)	-	-	480	565	880	1065	1710	2210	
DIM (ft-in.)	A	-	3-11 $\frac{3}{4}$	4-0 $\frac{1}{4}$	4-9 $\frac{1}{2}$	4-10 $\frac{1}{2}$	5-4	6-7 $\frac{1}{2}$	
	B	-	1-9 $\frac{3}{4}$	1-9 $\frac{1}{2}$	2-0 $\frac{1}{2}$	2-3 $\frac{3}{4}$	2-7 $\frac{1}{2}$	2-7 $\frac{1}{2}$	
	C	-	2-3 $\frac{3}{4}$	2-6 $\frac{1}{4}$	3-1 $\frac{1}{4}$	3-3 $\frac{3}{4}$	3-7 $\frac{1}{4}$	3-9 $\frac{1}{4}$	
5H DUPLEX (Fig. 6)									
COMPRESSOR	40/60	60/80	80/80	80/120	120/120				
WT (lb)	2210	2713	3225	3840	4305				
DIM (ft-in.)	A	8-7 $\frac{1}{2}$	9-2 $\frac{1}{4}$	10-10 $\frac{1}{2}$	11-5 $\frac{1}{4}$	11-10 $\frac{1}{4}$			
	B	2-8 $\frac{3}{8}$	2-8 $\frac{3}{8}$	2-8 $\frac{3}{8}$	2-8 $\frac{3}{8}$	2-8 $\frac{3}{8}$			
	C	3-4 $\frac{1}{8}$	3-6 $\frac{1}{4}$	3-6 $\frac{1}{4}$	3-9 $\frac{1}{8}$	3-9 $\frac{1}{8}$			

Compressor units (except 5H80) with slightly different dimensions and horsepower requirements are available to accommodate oversize condensers and motors. See certified prints for dimensions.

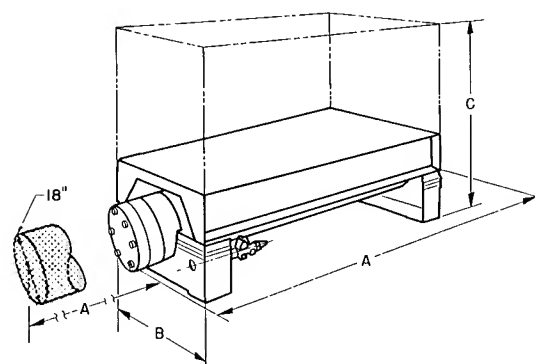
\*Belt drive units not available for 5H46, 66, 86 and 126 sizes

Table 2 - Compressor Connections

COMPRESSOR		5F				5H			
		20	30	40	60	40, 46	60, 66	80, 86	120, 126
CONN. (in. OD)	Suct	1-1/8	1-5/8	2-1/8	2-5/8	3-1/8	3-5/8	4-1/8	
	Disch	7/8	1-3/8	1-5/8	2-1/8	2-5/8	3-1/8	3-5/8	

Table 3 - Min Rpm for Capacity Control and Lubrication

COMPRESSOR	RPM
5F20	600
5F30	700
5F40; 5H40, 46; 5H40/60	800
5F60; 5H60, 66, 120, 126; 5H120/120	900
5H80, 86; 5H60/80, 80/80, 80/120	1100



SPACE FOR TUBE REMOVAL EITHER END

Fig. 7 - Direct Drive, Belt Drive Condensing Unit (Table 5)

Table 4 - Condenser Water Connections (in. FPT)

CONDENSER	MAX PASSES	MIN PASSES	
	In and Out	In*	Out
5F20	1/2	1/2	1 1/2
5F30	3/4	3/4	1 1/2
5F40, 60	1-1/4	1-1/4	1-1/2
09RH027	2	2	2-1/2
09RH043, 054, 070	2	2	3
09RH084, 097	2-1/2	2-1/2	4
09RH127	3	3	5

\*Two connections required.

†MPT

‡IPS

## INSPECT SITE

**Provide Clearance** for removing cylinder heads and valve plates. Allow space on pump end for crankshaft removal. Space for 5F20, 30, 40, 60, 5H40, 46, 60 and 66 is 20 inches; for 5H80, 86, 120 and 126, 30 inches.

Space at end of condenser must be equal to length of condenser to facilitate tube removal and cleaning.

Table 5 - Condensing Unit Physical Data (Fig. 7)

DRIVE		BELT														
COMPR		5F20		5F30		5F40		5F60		5H40		5H60				
COND		20	30	20	30	40*	30	40	60	40	60	60	027	043	027	043
WT (lb)		385	425	430	460	830	790	960	1050	1070	1230	1500	1715	1955	1925	2165
DIM. (ft-in.)	A	3- 2 <sup>7</sup> / <sub>8</sub>	3- 4 <sup>1</sup> / <sub>8</sub>	3- 2 <sup>7</sup> / <sub>8</sub>	3- 4 <sup>1</sup> / <sub>8</sub>	5- 3	4- 3 <sup>3</sup> / <sub>8</sub>	5- 3	6- 2	5- 3	6- 2	6- 2	6- 5	6- 7 <sup>1</sup> / <sub>4</sub>	6- 5	6- 7 <sup>1</sup> / <sub>4</sub>
	B	1- 9 <sup>3</sup> / <sub>8</sub>		1- 9 <sup>3</sup> / <sub>8</sub>		2- 3		2- 3		2- 3 <sup>5</sup> / <sub>8</sub>			2- 8 <sup>3</sup> / <sub>8</sub>		2- 10 <sup>1</sup> / <sub>8</sub>	
	C	2- 5		2- 4 <sup>1</sup> / <sub>4</sub>		2- 9 <sup>1</sup> / <sub>2</sub>		2- 10 <sup>1</sup> / <sub>8</sub>		3- 1 <sup>5</sup> / <sub>8</sub>		3- 8 <sup>3</sup> / <sub>4</sub>	3- 9 <sup>1</sup> / <sub>4</sub>	3- 11 <sup>1</sup> / <sub>4</sub>	3- 10 <sup>1</sup> / <sub>8</sub>	4- 0 <sup>1</sup> / <sub>8</sub>
DRIVE		BELT														
COMPR		5H60		5H80		5H120								DIRECT		
COND		054	054†	070	043	054	070	084	097	054	070	084	097	40	60	-
WT (lb)		2390	2650	2710	2845	2990	3050	3385	3690	3589	3664	3955	3240	880	970	-
DIM. (ft-in.)	A	7- 11 <sup>1</sup> / <sub>4</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	6- 7 <sup>1</sup> / <sub>4</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>1</sup> / <sub>8</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>1</sup> / <sub>8</sub>	5- 3	6- 2	-	-	-	-
	B	2- 10 <sup>1</sup> / <sub>8</sub>	3- 8 <sup>1</sup> / <sub>4</sub>		3- 9 <sup>3</sup> / <sub>8</sub>			3- 11 <sup>1</sup> / <sub>4</sub>			1- 9 <sup>3</sup> / <sub>4</sub>	-	-	-	-	-
	C	4- 0 <sup>1</sup> / <sub>8</sub>	4- 3 <sup>1</sup> / <sub>8</sub>		4- 5 <sup>5</sup> / <sub>8</sub>			4- 8 <sup>1</sup> / <sub>8</sub>			2- 10 <sup>1</sup> / <sub>8</sub>	-	-	-	-	-
DRIVE		DIRECT														
COMPR		5F60		5H40		5H46		5H60		5H66						
COND		60	027	027	043	043	054	070	043	054	070	084	054	070	084	097
WT (lb)		1060	1385	1605	1890	1890	2025	2095	2025	2190	2740	2800	2190	2740	2800	3105
DIM. (ft-in.)	A	6- 2	6- 5	6- 5	6- 7 <sup>1</sup> / <sub>4</sub>	6- 7 <sup>1</sup> / <sub>4</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	6- 7 <sup>1</sup> / <sub>4</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>3</sup> / <sub>8</sub>	-
	B	1- 9 <sup>3</sup> / <sub>4</sub>	2- 0 <sup>3</sup> / <sub>4</sub>	2- 2		2- 2		2- 4 <sup>5</sup> / <sub>8</sub>	2- 4 <sup>5</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>2</sub>	2- 4 <sup>5</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>2</sub>	2- 4 <sup>5</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>2</sub>	2- 10 <sup>1</sup> / <sub>8</sub>	-
	C	3- 2 <sup>1</sup> / <sub>2</sub>	3- 4 <sup>1</sup> / <sub>4</sub>	3- 9 <sup>1</sup> / <sub>4</sub>	3- 11 <sup>1</sup> / <sub>4</sub>	3- 11 <sup>1</sup> / <sub>4</sub>		4- 0 <sup>1</sup> / <sub>8</sub>	4- 0 <sup>1</sup> / <sub>8</sub>	4- 3 <sup>1</sup> / <sub>8</sub>	4- 0 <sup>1</sup> / <sub>8</sub>	4- 3 <sup>1</sup> / <sub>8</sub>	4- 0 <sup>1</sup> / <sub>8</sub>	4- 3 <sup>1</sup> / <sub>8</sub>	4- 4 <sup>1</sup> / <sub>8</sub>	-
DRIVE		DIRECT														
COMPR		5H80		5H86		5H120		5H126								
COND		054	070	084	097	070	084	097	127	070	084	097	127	097	127	-
WT (lb)		2930	2990	3315	3620	2990	3315	3620	4230	3570	3870	4130	4740	4130	4740	-
DIM. (ft-in.)	A	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>3</sup> / <sub>8</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>3</sup> / <sub>8</sub>	8- 4 <sup>5</sup> / <sub>8</sub>	7- 11 <sup>1</sup> / <sub>4</sub>	8- 3 <sup>3</sup> / <sub>8</sub>	10- 3 <sup>3</sup> / <sub>8</sub>	8- 4 <sup>5</sup> / <sub>8</sub>	10- 3 <sup>3</sup> / <sub>8</sub>	8- 4 <sup>5</sup> / <sub>8</sub>	-	-
	B	2- 6 <sup>1</sup> / <sub>8</sub>	2- 9 <sup>1</sup> / <sub>8</sub>	2- 6 <sup>1</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>4</sub>	2- 10 <sup>1</sup> / <sub>2</sub>	2- 5 <sup>1</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>2</sub>	2- 10 <sup>1</sup> / <sub>8</sub>	2- 5 <sup>1</sup> / <sub>8</sub>	2- 7 <sup>1</sup> / <sub>2</sub>	2- 10 <sup>1</sup> / <sub>8</sub>	2- 7 <sup>5</sup> / <sub>8</sub>	2- 10 <sup>1</sup> / <sub>8</sub>	-	-
	C	4- 5 <sup>3</sup> / <sub>8</sub>	4- 5 <sup>3</sup> / <sub>8</sub>	4- 3 <sup>3</sup> / <sub>8</sub>	4- 6 <sup>3</sup> / <sub>8</sub>	4- 10 <sup>1</sup> / <sub>8</sub>	4- 8 <sup>1</sup> / <sub>8</sub>	4- 8 <sup>1</sup> / <sub>8</sub>	5- 0 <sup>1</sup> / <sub>8</sub>	4- 8 <sup>1</sup> / <sub>8</sub>	5- 0 <sup>1</sup> / <sub>8</sub>	4- 8 <sup>1</sup> / <sub>8</sub>	5- 0 <sup>1</sup> / <sub>8</sub>	4- 8 <sup>1</sup> / <sub>8</sub>	-	-
5F Condenser No.		09RH Condenser No.														

5F Condenser No.

09RH Condenser No.

\*Special order only.

†For 60- and 75-hp motors.

Table 6 - Condensing Unit Refrigerant Connections (in. OD)

COMPR		5F20		5F30		5F40		5F60		5H40							
COND		20	30	20	30	40	30	40	60	40	60	027	60	027	043	-	
CONN.	Suction	1 $\frac{1}{8}$		1 $\frac{1}{8}$		1 $\frac{1}{8}$		2 $\frac{1}{8}$		2 $\frac{5}{8}$						-	
	Liquid	$\frac{1}{2}$		$\frac{1}{2}$		$\frac{7}{8}$		$\frac{1}{2}$		$\frac{7}{8}$		1 $\frac{1}{8}$		$\frac{1}{8}$		-	
COMPR		5H46			5H60				5H66				5H80			-	
COND		043	054	070	027	043	054	054*	070	084	054	070	084	097	043	054	
CONN.	Suction	2 $\frac{5}{8}$		3 $\frac{1}{8}$				3 $\frac{1}{8}$				3 $\frac{1}{8}$					-
	Liquid	1 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{3}{8}$		1 $\frac{5}{8}$		2 $\frac{1}{8}$		1 $\frac{5}{8}$		2 $\frac{1}{8}$		1 $\frac{3}{8}$		1 $\frac{5}{8}$	
COMPR		5H80			5H86			5H120				5H126					-
COND		070	084	097	070	084	097	127	054	070	084	097	127	097	127	-	
CONN.	Suction	3 $\frac{5}{8}$		3 $\frac{5}{8}$				4 $\frac{1}{8}$				4 $\frac{1}{8}$					-
	Liquid	1 $\frac{3}{8}$	2 $\frac{1}{2}$	1 $\frac{3}{8}$	2 $\frac{1}{2}$		1 $\frac{5}{8}$		2 $\frac{1}{2}$		2 $\frac{1}{2}$			2 $\frac{1}{2}$		-	

5F Condenser No.

09RH Condenser No.

\*For 60- and 75-hp motors.

**Machine Room Temperature and Ventilation -** Locate compressor or condensing unit in well ventilated space. Check code requirements. Provide forced ventilation thru ductwork when natural ventilation is inadequate.

Protect water-cooled condensers, water lines, and accessories from freezing during winter shutdown periods.

### PREPARE FOUNDATION

Fasten compressor to: (a) steel base and vibration isolators on floor; (b) steel base and condenser support stand or (c) concrete base.

**Floor Foundations -** Locate compressors over joists or beams wherever possible.

Weak floors in old buildings must be reinforced with steel beams or timbers to support the heavy compressors or condensing units. Use care in placing supports to avoid transmitting objectionable vibrations to other areas.

**Concrete Foundations** one to two times the weight of the machinery they support will absorb vibration. See Fig. 8 and Tables 7 and 8 for recommended dimensions. Let foundation set sufficiently before compressor is installed (approximately 3 days). Allow for 3/8 inch to 1/2 inch grout after compressor is installed.

Heavy aggregate concrete weighs about 150 pounds per cubic foot.

### INSPECT UNIT

Inspect shipment for damage or loss. File claim immediately with shipping company for any loss or damage.

Move and rig unit carefully to prevent damage to gages, mounting brackets, refrigerant piping and connections.

### COMPRESSOR INSTALLATION

**Compressor on Steel Base and Vibration Isolators on Floor -** Install vibration isolators on one end of unit at a time. See Fig. 9 for typical vibration isolator mounting.

Motor fastening set supplied with all compressors (except 5F20,30) includes several beveled washers. Washers are installed under heads of capscrews used to fasten unit base to vibration isolators or floor.

Position compressor and motor on frame and check height of vibration isolators. Shim between vibration isolators and floor to level compressor base. Secure vibration isolators to floor. If beveled washer (Fig. 9) is omitted, end of capscrow may strike the floor and cause vibration isolator to rupture when it is secured to floor.

**Condenser and Stand Assembly -** Place cast iron condenser stands in their correct location. Make distance "C" (Fig. 10) between tapped holes on top of stand equal to holes in lower flange of compressor unit base. See Table 9 for dimensions.

Shipping caps are soldered to the 5F20,30,40 and 60 condensers at the factory. To remove caps turn condensers upside down. This prevents solder from falling into condensers.

Bolt lower support strap loosely to lower side of each condenser stand.

Place condenser on stands with front water head at compressor end of base. Position con-

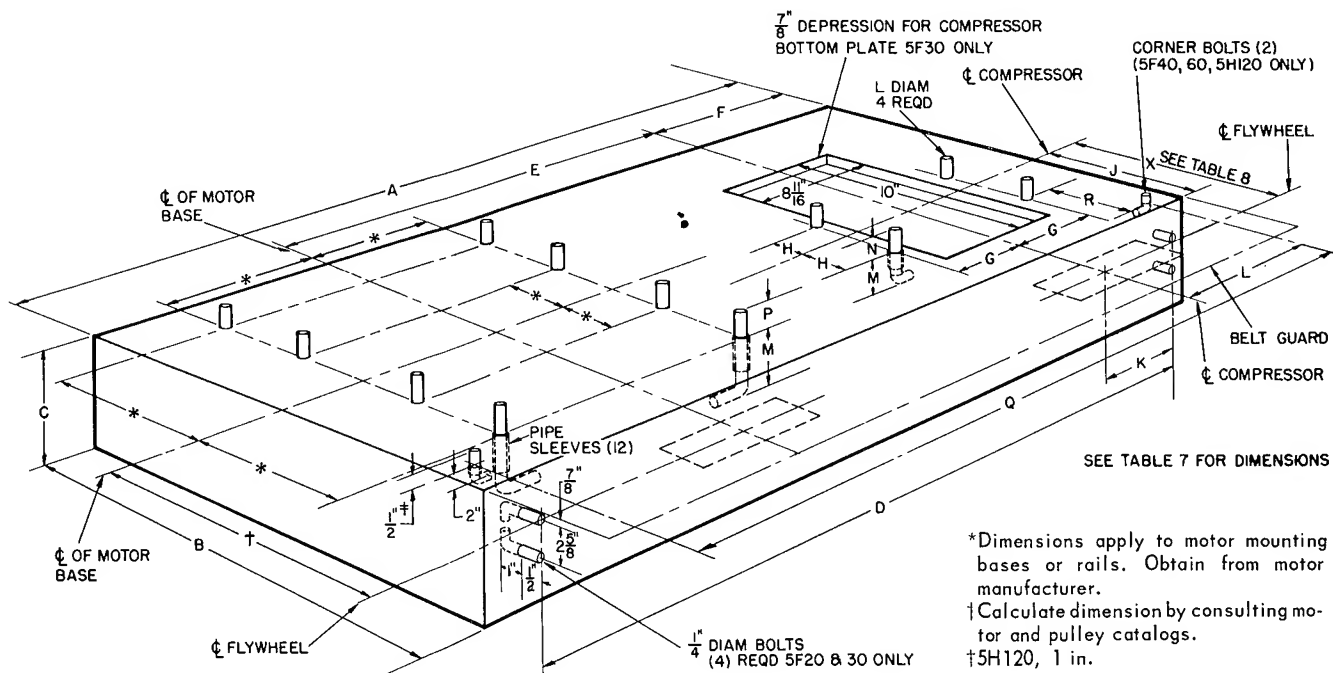


Table 7 - Concrete Base Dimensions (Fig. 8)

DIMEN (in.)	5F				5H			
	20	30	40	60	40	60	80	120
A		36		48	53	57	60	71
B		19		26	28	30	40	37
C	7	9		10	13	14	15	16
D	33-1/8		45					66
E	20.2*		25.5*		30.7*		38.2*	
	19.3†		26.6†		32.2†		36.7†	
F		8		9		10	14-1/2	
G		5		4	5-1/2		5-1/2	
H	2-7/8		6	6-23/32	7-3/4	8-1/2	14-1/2	
J	5-1/32	6-15/16	9-1/2	10-1/2	11-1/2	12	16-1/2	18-1/2
K	9-9/16		7-1/8					12
L		1/2				5/8		
M	3			4			6	
N		1-1/2			1-3/4	2-1/2	2	
P		2			2-1/4	2-1/2		
Q			45					66
R			1-3/4	2				1-3/4

\*1450 rpm.

†1750 rpm.

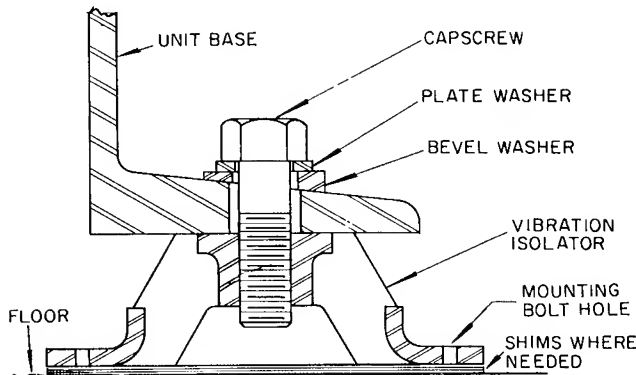


Fig. 9 - Typical Vibration Isolator Mounting

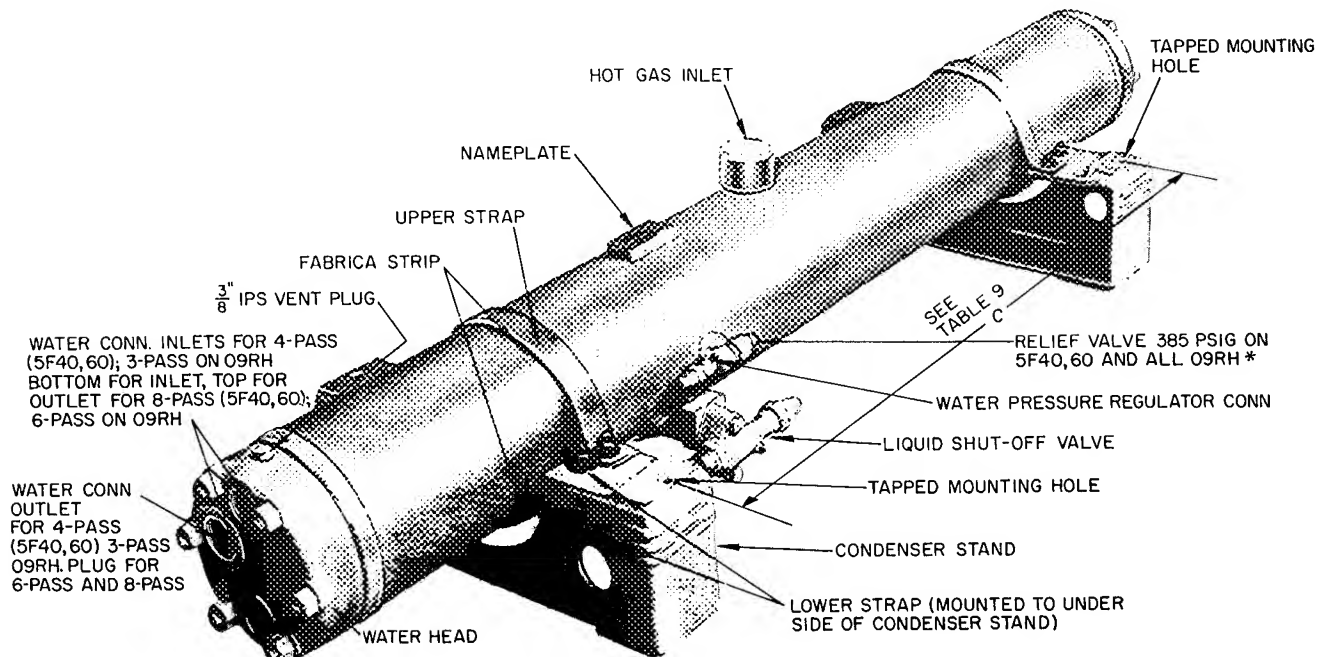
Table 8 - Distance Between Compressor and Flywheel Centerlines (Fig. 8)

COMPR SIZE	MOTOR HP	COMPRESSOR RPM	BELTS (No.) Size	DIMEN X (in.)
5F20	5, 7-1/2, 10	1750 & 1450	(2) B	7-15/16
	5	1450	(2) B	9-21/32
5F30	7-1/2	1450	(3) B	10-31/32
	10, 15	1750 & 1450		
5F40	7-1/2, 10, 15, 20	1750 & 1450	(3) B	10-3/4
5F60	10, 15, 20	1750 & 1450	(3) B	11-7/16
	10, 15, 20, 25	1750 & 1450	(4) B	11-13/16
5H40	20, 25, 30, 40, 50	1750 & 1450	(3) C	13-3/8
	30, 40, 50	1450	(5) C	13-3/4
	30	1750 & 1450	(3) C	14-1/8
5H60	30	1450	(5) C	14-1/2
	40, 50	1750 & 1450	(5) C	14-1/2
	60, 75	1750	(5) C	14-1/2
	40, 50	1750	(5) C	20-1/2
	40, 50	1450	(6) C	18-5/8
5H80	60	1750 & 1450	(6) C	18-5/8
	75	1750	(6) C	18-5/8
	60, 75	1450	(9) C	21-3/8
	100	1750	(9) C	21-3/8
5H120	60	1750	(9) C	20-5/8
	60	1450	(9) C	21-1/2
	75, 100	1750 & 1450	(9) C	21-1/2

denser so hot gas inlet is on top and ends over-hang stands same distance on each end.

Assemble upper straps loosely around the condenser.

**Compressor on Steel Base and Support Stand -**  
Place compressor unit on top of condenser stands and bolt into place with capscrews and lock washers provided.



\*5F20 AND 30 HAVE FRANGIBLE DISC

Fig. 10 - Typical Assembled Condenser Package

**Table 9 - Dimension "C" (ft-in.) (Fig. 10)**

	COMPR	DRIVE	
		Belt	Direct
5F	20	2-8-3/8	-
	30	2-8-3/8	-
	40	3-7-7/8	3-7-7/8
	60	3-7-7/8	3-7-7/8
	60*	-	4-2-3/4
5H	40	4-2-3/4	4-2-3/4
	46	-	4-2-3/4
	60	4-2-3/4	4-2-3/4
	66	-	4-2-3/4
	60*	-	4-5-1/2
	66*	-	4-5-1/2
	80	4-7-3/4	5-9-3/4
	86	-	5-9-3/4
	120	4-7-3/4	5-9-3/4
	126	-	5-9-3/4

\*Oversize base.

Loosely connect compressor discharge line and adjust condenser position so discharge line is in line with condenser inlet. *Assemble discharge lines for 5H Series compressors as shown on special diagram sheet included in 5H condenser piping packages.* Before making joints, try coupling or belt guard to ensure piping clearance.

Place strips of Fabrica provided between lower support straps and condenser. See Fig. 10.

Tighten lower strap enough to lift condenser off stands.

Sweat discharge line to condenser. Adjust condenser position as required to prevent distortion of discharge line. Instructions are included in the piping assembly package.

Place Fabrica strips (see Fig. 10), between condenser and upper straps. Tighten strap bolts to secure condenser to stand. NOTE: Use lower straps only for 5F20 and 30 units. Place the two extra strips of Fabrica between top of condenser and base. Assemble discharge line as described above.

**Compressor Bolted to Concrete Base** - See Fig. 8. Set compressor level on foundation bolts. (Level in two directions.) Removal of discharge shut-off valve exposes face of mounting flange on compressor which can be used as a leveling pad. Locate and level motor slide rails. Provide for 3/8 inch to 1/2 inch grout. Tighten foundation bolts handtight. Do not use wrench.

Wet top of concrete, pour grout and tamp to fill all spaces between machinery and concrete. Allow grout to dry slightly then trowel smooth.

Suggested mixture for grout is one part Portland cement to two or three parts of sharp sand.

Tighten foundation bolts moderately tight when grout has hardened for 24 to 36 hours. Overtightening bolts may cause compressor misalignment.

## CRANKCASE HEATER

Energizing crankcase heater helps prevent oil and refrigerant from mixing and accumulating in crankcase when compressor is off.

Wire heater to relay or set of normally closed contacts in compressor starter so it will be de-energized when compressor is operating.

**Installation of Heaters** - Remove rubber plug from crankcase heater casing (see Fig. 1 thru 4).

Insert heater element entirely into casing. Element should fit snugly, not loosely.

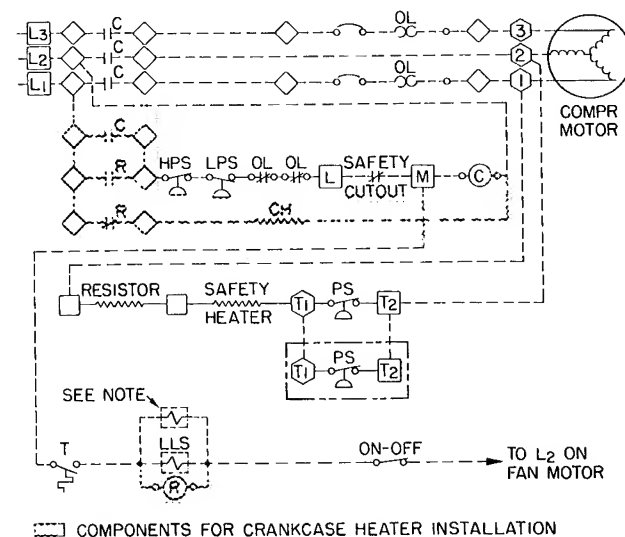
Wire in accordance with local codes and diagram (Fig. 11).

**Relay Coil** voltage is determined by control circuit voltage which must be specified when ordering relays.

Mount relays vertically.

When crankcase heater is installed, system can operate on a single pumpout cycle as shown in schematic, Fig. 11.

Crankcase heater packages are given in Table 10 and corresponding relay is in Table 11. When two heaters are used on a 5H80 or 120 compressor only one relay is required.



COMPONENTS FOR CRANKCASE HEATER INSTALLATION

NOTE: Auto-suction stop valve (flooded systems only)

- |                            |                                |
|----------------------------|--------------------------------|
| C - Compressor             | Terminal Connections, Marked   |
| CH - Crankcase Heater      | Component Connection, Unmarked |
| HPS - High Pressure Switch | Component Connection, Marked   |
| LLS - Liquid Line Solenoid |                                |
| LPS - Low Pressure Switch  |                                |
| OL - Overload              |                                |
| PS - Pressure Switch       |                                |
| R - Relay                  |                                |
| T - Thermostat             |                                |
|                            | Field Wiring                   |

**Fig. 11 - Wiring Schematic Single Pumpout Cycle**

**Table 10 - 5F,H Compressor Crankcase Heater Package**

COMPRESSOR	ELECTRICAL CHARACTERISTICS		PACKAGE NUMBERS
	Volts	Watts	
5F20,30,40,60	115	100	-5-F--20---381
	230	100	-5-F--20---391
5H40,46,60,66	115	200	-5-H--40---381
	230	200	-5-H--40---391
5H80,86,120,126	115	200	-5-J--40---291
	230	200	-5-J--40---291

**Table 11 - Crankcase Heater Relay (60-Cycle)**

CONTROL CIRCUIT VOLTAGE	PART NUMBER
115	HN61AJ-101
208/230	HN61AJ-108

### COMPRESSOR OPERATION

**Motor Rotation** - Start motor before connecting to compressor. Rotation direction must be same as arrow cast on pump cover or plate attached near pump end bearing housing. To rotate compressor in opposite direction the manually reversible oil pump must be reversed as follows:

5H120 AND 126; ALL 5F COMPRESSORS - Remove 6 capscrews from oil pump cover. Do not damage gasket. Rotate cover 180° and replace. Arrow will now be on top and show new direction of rotation.

5H40,46,60,66,80 AND 86 COMPRESSORS - Drain oil below level of end bell cover. Remove end bell assembly and pump end cover. Rotate cover 180° and replace. Reverse direction of external arrow (shows compressor rotation without removing end bell). Arrow on pump end cover must match arrow on main bearing housing. Replace end bell and refill with specified oil.

**CAUTION:** If special gasket between oil pump cover and oil pump is damaged, replace it with correct gasket only. Check oil pump rotor and clearance (.0015 to .0025). Check oil pressure immediately after starting compressor.

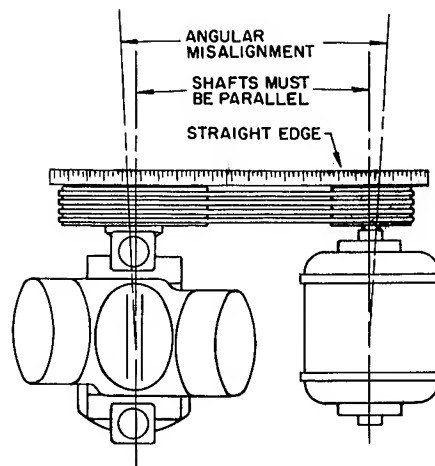
**Oil Safety Switch** installation instructions are included in Oil Safety Switch Packages.

**Motor Fastening Set** supplied with all compressor units (except 5F20,30) includes motor blocks and shims for motor alignment; capscrews, plate washers and lock washers for fastening motor to base; taper dowel pins for securing motor position on base (after alignment); beveled washers for fastening unit base to vibration isolators or floor.

**Install and Align Belt Drive** - Clean motor and compressor shafts, flywheel and motor pulley bores with fine emery cloth.

Install motor pulley, flywheel and keys tightly on shafts.

Slide motor forward on rails to install belt. Line up flywheel and motor pulley with a straight edge



**Fig. 12 - Correct Belt Alignment**

or string (Fig. 12) or by placing a round rod in belt grooves. Slide motor pulley on shaft to correct any parallel misalignment. Loosen motor hold-down bolts and turn motor frame to correct any angular misalignment.

Move motor backward with adjusting bolts to tighten belts. Tighten belts just enough to prevent slippage.

Determine belt tension by: (a) loosening belts until they slip when motor starts (belt squeals), then tighten enough to eliminate slippage, (b) amount belt is depressed at center of span (heavier belts deflect approximately 1 inch for a 24-inch span; lighter belts or longer span deflect proportionately more)

**Install Direct Drive** - Instructions for installation are in the coupling package

**Securing Motor to Base** - Align motor and compressor. Drill and ream two holes thru motor feet and base. Secure motor to base with two #6 x 2-1/2 taper dowel pins provided in motor fastening set. Locate holes diagonally opposite motor feet. Use 9/32-inch diameter drill and #6 taper reamer.

### REFRIGERANT PIPING

Refer to Carrier System Design Manual, Part 3 for proper piping techniques.

**Venting** - Replace vent plugs (front and rear heads) and drain plug (front head) with nipples and valves if frequent draining of condenser (water side) is desired.

**Refrigerant Drier** - See System Design Manual, Part 3, Page No. 3-75.

**Felt Filter** - Install felt filter (supplied with compressor) in suction line screen. Remove after 50 hours of compressor operation. If dirty, clean with kerosene or neutral spirits and replace for another 50 hours operation. If filter is clean, leave it out.

Indicate on tag that filter has been cleaned and reinstalled.



**Oil Filter** should be replaced after 50 hours operation and whenever oil is changed or becomes dirty.

**Oil Separator (Optional)** - Install separator so its weight is carried by supports or hangers and not piping.

Connect separator inlet to compressor discharge and separator outlet to condenser. Connect oil return line (1/4-inch or 3/8-inch copper tubing) between separator and compressor crankcase. Make line long enough to be flexible and free from strain. Connect oil return line to upper oil and gas equalizer line connection (if available) on compressor. When two compressors are installed in parallel, connect oil return line to oil equalizer line between the two compressors. Install shut-off valve in oil return line to facilitate service and minimize refrigerant loss.

An additional oil charge is required when an oil separator is used. Watch oil level and check separator float valve operation during initial compressor operation. Follow instructions furnished with oil separator.

**Compressor Muffler (Optional)** - Mufflers are included in condenser piping packages for all 5H condensing units. *They are recommended for all remote installations.* Install mufflers either horizontally or vertically (refrigerant flow downward). Arrow on muffler indicates flow direction. Place outlet at bottom in horizontal installations to prevent trapping oil. Locate muffler as close as possible to compressor.

**Special Handhole Cover Plates (Optional)** have tapped holes for connecting equalizer lines. When operating compressors in parallel, replace standard covers with special covers. See Fig. 13.

5H120 AND 126 - Tapped cover plate is standard on 5H120 and 126 compressors. Use only lower connection for oil equalization. Connect gas equal-

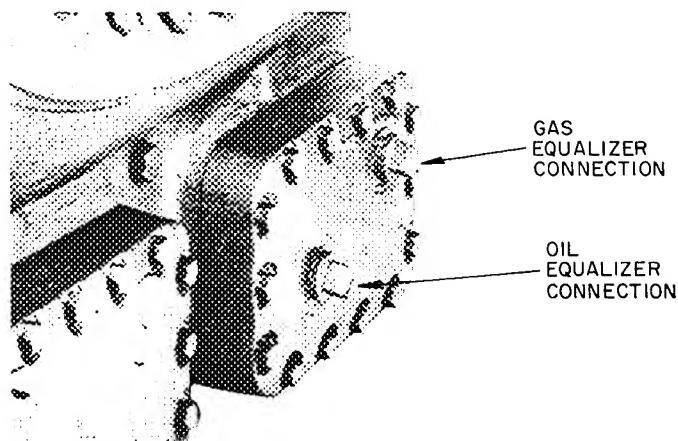


Fig. 13 - Special Handhole Cover with Equalizer Connections

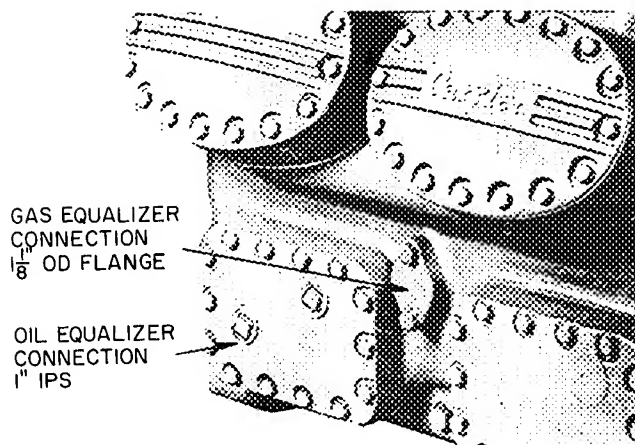


Fig. 14 - Equalizer Connections (5H120 and 126)

ization line at flange connection. See Fig. 14. Mating flange for 1-1/8 inch OD is Mueller part no. A-515; gasket no. A-5152.

5F20 AND 30 compressors have no special tapped cover plate. Use opening for oil sight glass with 1-1/8-inch line for gas and oil equalization. For additional equalization, run a 3/8-inch line to oil fill plug. See Fig. 15.

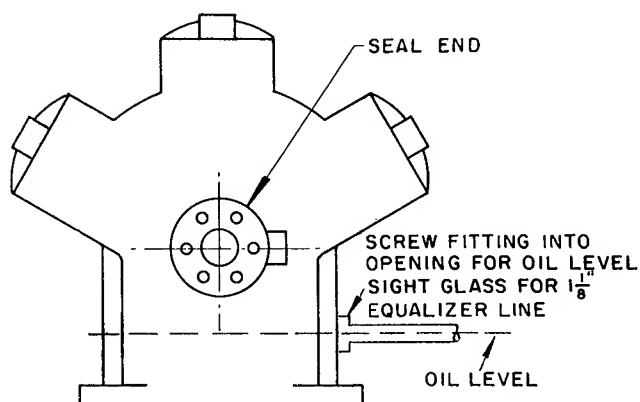


Fig. 15 - Equalizer Connections (5F20 and 5F30)

**Cooled Heads** - When used, install water-cooled heads and piping as shown in Fig. 16.

5F20,30,40,60; 5H40,46,60,66,80 AND 86 compressors have one water circuit piped to flow in either direction. See Fig. 16.

5H120 AND 126 compressors have two parallel circuits with two 1/2-inch IPS water inlet connections and one 1/2-inch IPS water outlet connection. See Fig. 16.

Install manually operated valve in each water circuit, adjusted for 100 F maximum leaving water temperature.



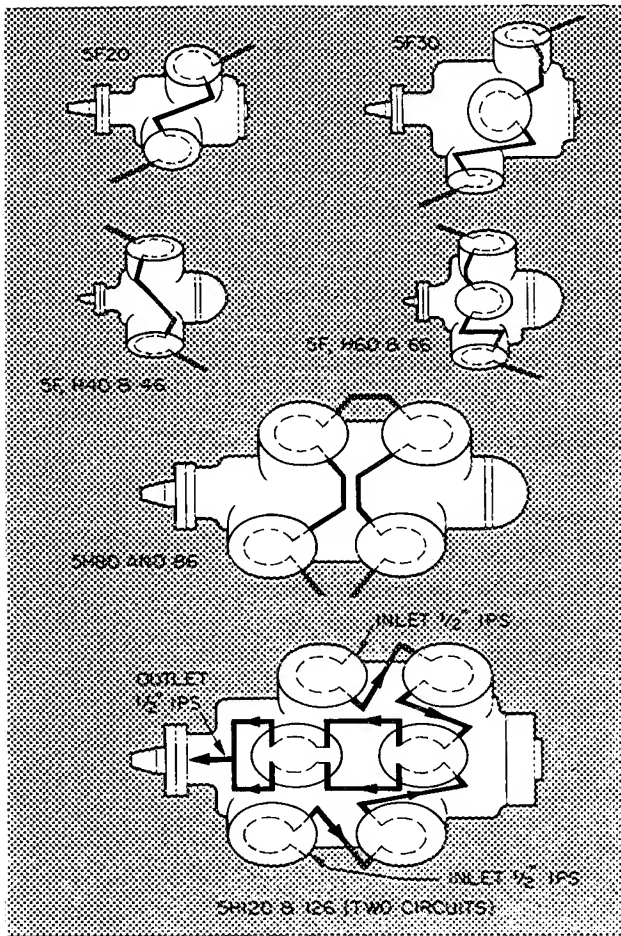


Fig. 16 - Schematic Piping for Water-Cooled Heads

### CONDENSER WATER PIPING

**Piping** - Use piping for maximum pass operation, Fig. 17, when ample water pressure is available. Use minimum pass operation, Fig. 18, for low water pressure or when cooling tower is used.

**Water Regulating Valve Adjustment** - Set shut-off point at least 10 F below condensing temperature to be maintained at maximum load, but not above 90 F. Select shut-off point high enough to close valve when unit is not operating.

### LUBRICATION

Compressors are charged with oil at the factory. Oil quantities are given in Table 12.

Maintain oil level at center of sight glass.

When adding oil, use only a dehydrated, wax-free refrigeration grade oil of suitable viscosity.

Compressors are charged with refrigeration grade oil (Carrier No. PP36) for evaporator temperatures above -45 F. When evaporator temperature is -40 or below, replace oil with Carrier No. PP33.

Table 12 - Compressor Oil Charge

COMPRESSOR	5F20	5F30	5F40	5F60	5H40, 5H46	5H60, 5H66	5H80, 5H86	5H120, 5H126
OIL CHG (pt)	5	5-1/2	12	13	18	21	41	81

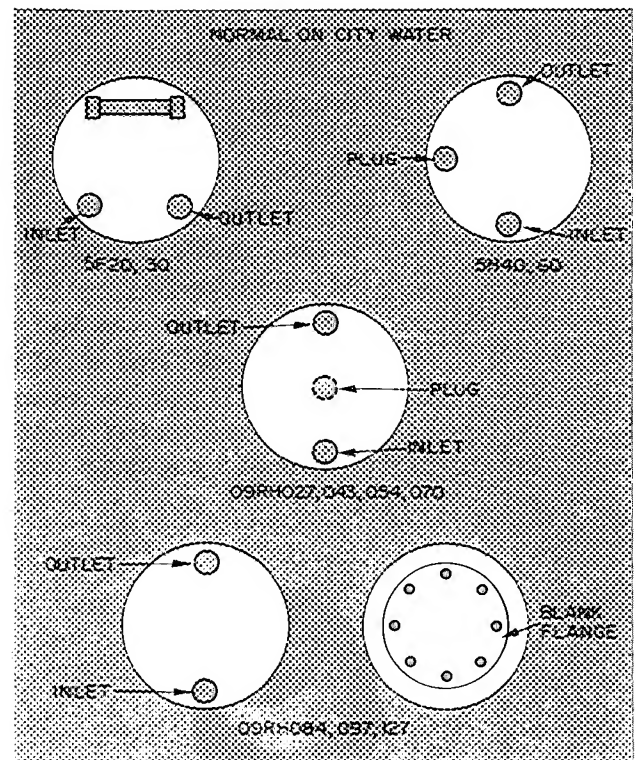


Fig. 17 - Condenser Maximum Pass Connections

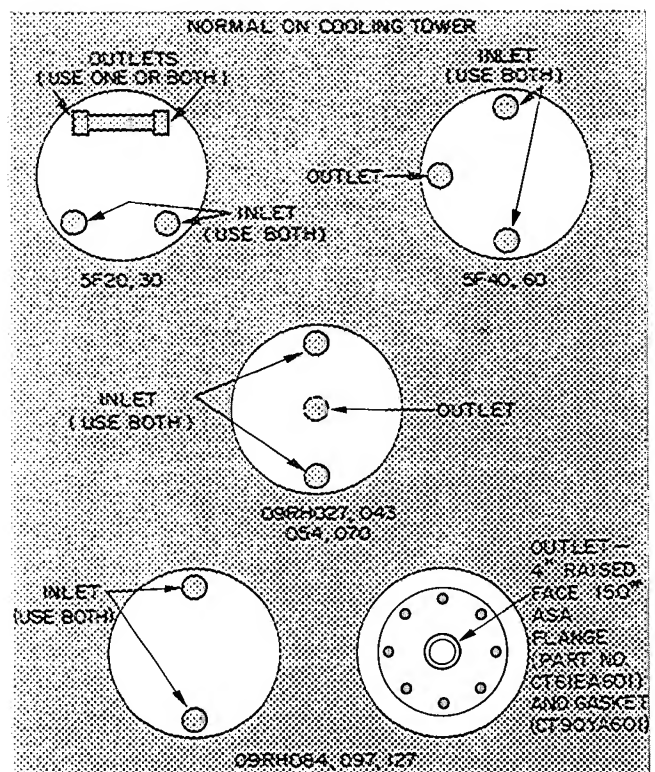


Fig. 18 - Condenser Minimum Pass Connections

## REFRIGERANT CHARGING

Refer to 5F,H Start-Up and Service Instructions and Carrier Standard Service Techniques Manual, Chapter 1, for complete charging information.

**Pneumatic Control** may be connected to capacity control valve on all 5F,H compressors except 5F20 and 5F30. A 1/4-inch IPS connection is located above the capacity control valve on each compressor.

The capacity control valve is set as described in the Start-Up and Service book.

The pneumatic control, in effect, resets the control point upward by the amount of air pressure applied. Do not apply more than 25 psig. For example, if system suction pressure is 40 psig and the control point setting is 35 psig, an applied air pressure of 5 psig causes first cylinder to unload.

;

Manufacturer reserves the right to change any product specifications without notice.

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